

REMARKS

Claim Status

Claims 1, 3, 4 and 6-8 are now pending, with claim 1 being the sole independent claim. Claims 2, 5, 9-12 and 14 have been canceled. Claims 1 and 15 have been amended. Claim 1 has been amended to incorporate the subject matter of canceled claims 2 and 5. No new matter has been added. Reconsideration of the application, as amended, is respectfully requested.

Overview of the Office Action

Claims 9 and 11 were rejected under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 6,942,318 (“*Fartash*”). Claims 1 and 3-8 stand rejected under 35 U.S.C. §103(a) as unpatentable over *Fartash* in view of U.S. Patent No. 6,534,128 (“*Carlson*”). Claims 12, 14 and 15 stand rejected under 35 U.S.C. §103(a) as unpatentable over *Fartash* in view of *Carlson*. Claim 10 stands rejected under 35 U.S.C. §103(a) as unpatentable over *Fartash* in view of U.S. Patent No. 6,827,423 (“*Katakura*”). Claim 2 stands rejected under 35 U.S.C. §103(a) as unpatentable over *Fartash* in view of *Carlson*, and in further view of U.S. Patent No. 6,827,423 (“*Katakura*”). Applicants have carefully considered the Examiner’s rejections, and the comments provided in support thereof, and respectfully disagree with the Examiner’s analysis. For the reasons which follow, it is respectfully submitted that all claims of the present application are patentable over the cited references.

Summary of Subject Matter Disclosed in the Specification

The following descriptive details are based on the specification. They are provided only for the convenience of the Examiner as part of the discussion presented herein, and are not intended to argue limitations which are unclaimed.

The application discloses an ink jet printer, an image recording method, ink for the ink jet printer and a recording head, wherein a high quality image is formed by jetting ink in appropriately-small liquid quantities without unevenly concentrating the jetted ink and without lowering the quality of printed characters due to clogging of the nozzle opening (see paragraph [0010] of US Pub. 2004/0080574).

The jetting opening of each nozzle, from which the ink is jetted, has a diameter equal to or more than 12 μm and not more than 22 μm (see paragraphs [0016], [0090] and [0091] of US Pub. 2004/0080574), and the ink substantially includes no volatile component (see paragraph [0102] of US Pub. 2004/0080574).

The volume of a drop of ink jetted from the nozzle is not less than 1 pico-liter and not more than 6 pico-liter. As a result, the diameter of a dot formed by jetted ink can be minimized, and a high definition image can be printed at proper ink concentrations (see paragraphs [0018] to [0019] and [0142] of US Pub. 2004/0080574).

The viscosity of the ink is not less than 20 mPa·s and not more than 200 mPa·s at 25° C, and the viscosity of the ink is not less than 8 mPa·s and not more than 30 mPa·s when the ink is jetted from a nozzle. As a result, after receiving the jetted ink on the recording medium, the ink can stick to the recording medium and can be appropriately leveled on the recording medium. Consequently, a high quality image can be formed, while the shape of each ink dot formed by the jetted ink on the recording medium can be easily controlled, and the image formed on the recording medium can be greatly enhanced. In addition, because viscosity of the ink is equal to or more than 8 mPa·s and not more than 30 mPa·s when the ink is jetted, clogging of the jetting opening can be prevented, and the ink can be smoothly jetted. As a result, it is possible to form a high quality image at a high level of efficiency (see paragraphs [0031] to [0034], [0103] and [0104] of US Pub. 2004/0080574).

Patentability of Claim 1 over the Prior Art under 35 U.S.C. §103

Independent claim 1 has been amended to incorporate therein the subject matter of claim 2 (now canceled), namely “wherein a volume of a drop of the ink jetted from each nozzle is not less than 1 pico-liter and not more than 6 pico-liter”. Independent claim 1 has also been amended to incorporate therein the subject matter of claim 5 (now canceled), namely “wherein a viscosity of the ink is not less than 20 mPa·s and not more than 200 mPa·s at 25 °C, and the viscosity of the ink is not less than 8 mPa·s and not more than 30 mPa·s when the ink is jetted from a nozzle of the ink jet printer.

Fartash (col. 3, lines 43-45) teaches a “bore diameter at a second nozzle surface which is in the range from about 2 micrometers to about 50 micrometers”. *Fartash* (col. 3, lines 45-48) states, “in particular nozzle bore diameters in a range from about 5 micrometers to about 35 micrometers and more particularly in a range from about 15 micrometers to about 30 micrometers can be utilized”. *Fartash* (col. 5, lines 9-11) teaches that ink drops are ejected in the range of from about one femtoliter to about ten nanoliters. However, as conceded by the Examiner, *Fartash* fails to teach or suggest the specific ink viscosity ranges and that the ink substantially includes no volatile component, as recited in amended independent claim 1. Furthermore, *Fartash* fails to teach or suggest that the volume of ejected ink drops is within the range recited in amended independent claim 1.

The Examiner cites *Carlson* to overcome the failure of *Fartash* to teach or suggest the features associated with the viscosity of the ink and the absence of the volatile component. Although *Fartash* discloses the structure of an ink jet head, *Fartash* fails to teach or suggest a specific composition of the ink. That is, *Fartash* is directed to providing low cost, small, reliable printer nozzles. Although *Carlson* discloses a composition of ink, *Carlson* fails to teach the claimed configuration of the ink jetting head. That is, *Carlson* is directed to provide a solvent free low viscosity ink. *Fartash* and

Carlson are directed to solving completely different problems and belong to non-analogous arts. Consequently, without reviewing Applicant's present disclosure, and hence, engaging in an impermissible hindsight analysis, a person skilled in the art would not combine these references and would not have any reason to develop therefrom the invention recited in amended independent claim 1.

Even if these references were to be combined, the combination still fails to obviate the present invention. Although *Carlson* (col. 4, lines 44-60) generally teaches ink viscosities at a temperature of 25° C, it is conceded by the Examiner that *Carlson* fails to teach or suggest an ink that has the volumetric properties of the ink recited in Applicant's amended claim 1. Consequently, the combination of *Fartash* and *Carlson* fails to achieve the invention recited in amended independent claim 1.

The Examiner cites *Katakura* to cure this deficiency of *Fartash* and *Carlson*, i.e., the failure to teach or suggest the claimed volume of a drop of the ink jetted from the nozzle. *Katakura*, however, fails to cure the deficiency of the combination of *Fartash* and *Carlson*. *Katakura* (col. 11, lines 32-35) teaches an ink that may be an aqueous or organic solution, wherein the ink has a viscosity of 1 cps to 10 cps, i.e., 1 mPa·s to 10 mPa·s. Amended independent claim 1 recites that the viscosity of the ink is not less than 20 mPa·s and not more than 200 mPa·s at 25° C and not less than 8 mPa·s and not more than 30 mPa·s when the ink is jetted from a nozzle of the ink jet printer. Hence, the viscosity of the ink taught in *Katakura* is not within the required range recited in Applicants' amended independent claim 1. Therefore, *Katakura* fails to cure the deficiency of the combination of *Fartash* and *Carlson*.

Furthermore, independent claim 1 recites that the ink substantially includes no volatile component. *Katakura* (col. 13, lines 25-32) teaches the inclusion of a low-boiling-point organic solvent, preferably monohydric alcohol. Consequently, *Katakura* teaches away from the ink defined in Applicants' amended independent claim 1, since the ink used in *Katakura* includes a solvent and is

therefore different than applicant's claimed ink which substantially includes no volatile component. A person having an ordinary level of skill in the art would simply not seek to modify the ink taught in *Carlson* based on the teachings of *Katakura* to provide the features which *Carlson* lacks. *Carlson* specifically states that the ink does not include a solvent. Thus, it is improper to replace the ink taught in *Carlson* with the ink taught in *Katakura* to thereby form the combination recited in amended independent claim 1. For this additional reason, *Katakura* fails to cure the deficiency of the combination of *Fartash* and *Carlson*. Therefore, amended independent claim 1 is patentable over the combination of *Fartash*, *Carlson* and/ or *Katakura* when applied singly or in combination. Accordingly, reconsideration and withdrawal of all the rejections under 35 U.S.C. §103(a) are in order, and a notice to that effect is earnestly solicited.

Dependent claims

In view of the patentability of independent claim 1, for the reasons presented above, each of dependent claims 3, 4, 6-8 and 15 is patentable therewith over the prior art. Moreover, each of these claims includes features which serve to even more clearly distinguish the invention over the applied references.

Conclusion

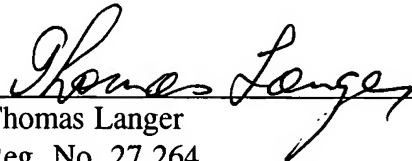
Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect and early passing of this application to issue are respectfully solicited.

Should the Examiner have any comments, questions, suggestions or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

It is believed that no fees or charges are required at this time in connection with the present application. However, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,

COHEN, PONTANI, LIEBERMAN & PAVANE

By 
Thomas Langer
Reg. No. 27,264
551 Fifth Avenue, Suite 1210
New York, New York 10176
(212) 687-2770

Dated: December 20, 2005